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No. 01-714

In the

Supreme Court of the United States

STATE OF UTAH, *et al.*,

Appellants,

v.

DONALD L. EVANS, *et al.*,

Appellees,

and

STATE OF NORTH CAROLINA, *et al.*,

Intervenor-Appellees.

On Appeal from the United States District Court for the District of Utah

MOTION TO AFFIRM OR, IN THE ALTERNATIVE, TO DISMISS

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COUNTER-STATEMENT OF QUESTIONS PRESENTED

1. Whether the Court has the authority to reassign a Congressional Representative from North Carolina to Utah?

2. Whether the district court correctly held that the use of imputation in the 2000 apportionment count is not "the statistical method known as 'sampling'" prohibited by the Census Act?

3. Whether the district court correctly held that the Constitution vests Congress with virtually unlimited discretion to direct how an "actual enumeration" shall be conducted and does not prohibit the use of imputation to improve its accuracy?

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MOTION TO AFFIRM OR, IN THE ALTERNATIVE, TO DISMISS

Pursuant to Rule 18.6 of the Rules of the Supreme Court of the United States, Intervenor-Appellees State of North Carolina, *et al.*, move this Court to affirm summarily the Order[1] of the three-judge United States District Court for the District of Utah, dated November 1, 2001, or in the alternative to dismiss the appeal on the ground that the questions raised by the appeal are so insubstantial as to require no further argument.

COUNTER-STATEMENT OF THE CASE

A. STATEMENT OF THE CASE

This is the second action[2] brought by the State of Utah and her State and federal elected officials (hereinafter "Utah") seeking to change the outcome of the 2000 decennial Census so that Utah, instead of North Carolina, gains an additional seat in Congress. (Compl. ¶ 41) Utah sought a declaratory judgment "that the Census Bureau's decision to supplement the actual enumeration of the 2000 apportionment population with the statistical sampling estimates under the imputation methodology violates" the Census Clause, the Fourteenth Amendment, the Census Act, and the Administrative Procedure

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[1] The Order sought to be reviewed appears in the Appendix to Appellants' Jurisdictional Statement (hereinafter "J.S. App.") at 1a.

[2] The previous action was *Utah v. Evans*, 143 F. Supp. 2d 1290 (D. Utah 2001), *summarily aff'd*, 2001 U.S LEXIS 10615, 70 U.S.L.W. 3359 (Nov. 26, 2001).

Act.[3] (Compl. at 15) Utah also requested the court to enjoin the Bureau to recalculate the apportionment count by eliminating all persons included through imputation, and to transmit the new apportionment to the President. Utah then would have the President transmit the new apportionment to the Clerk of the House of Representatives, who would then be expected to transmit new certificates reflecting the revised apportionment to North Carolina and Utah.[4] *Id.*

Defendants are Donald L. Evans, Secretary of the Department of Commerce, and William G. Barron, Acting Director of the Census Bureau (hereinafter "Census Bureau" or "the Bureau"). The State of North Carolina and a number of her State and federal elected officials (hereinafter "North Carolina") intervened as defendants. The Census Bureau and North Carolina, maintaining that imputation methodology is not a form of sampling forbidden by § 195 and is not prohibited by the Census Clause or the Fourteenth Amendment, moved to dismiss or for summary judgment. North Carolina also contended that the court lacked jurisdiction to do more than grant prospective relief on the ground that Congressional action would be required to override the apportionment already certified.

The case was heard by a three-judge panel, which, with one judge dissenting, granted the Bureau's and North Carolina's motions for summary judgment. The district court, relying on *Franklin v. Massachusetts*, 505 U.S. 788 (1992), unanimously concluded that it had jurisdiction to grant relief.

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[3] The district court dismissed Utah's APA claim, and Utah has not pursued it on appeal.

[4] Neither the President nor the Clerk is a party to this action.

The district court's Census Act analysis began with *Wisconsin v. City of New York*, 517 U.S. 1, 19 1996), in which this Court held that "the Constitution ves Congress with virtually unlimited discretion in conducting the decennial 'actual Enumeration.'" In the Census Act, Congress delegated to the Secretary of Commerce the responsibility for taking a decennial census "in such form and content as he may determine." 13 U.S.C. § 141 (a) (2001). This Court further held in *Wisconsin* that "so long as the Secretary's conduct of the census is 'consistent with the constitutional language and the constitutional goal of equal representation,' it is within the limits of the Constitution." 517 U.S. at 19-20. Finally, this Court held that the Secretary's decisions "need bear only a reasonable relationship to the accomplishment of an actual enumeration of the population, keeping in mind the constitutional purpose of the census." *Id.* at 20; (J.S. App. at 16a-17a).

The district court held that whether imputation is a form of sampling forbidden by § 195 is a question of law. (J.S. App. at 18a) It noted "that section 195 does not preclude the Census Bureau from the use of every type of statistical methodology in arriving at apportionment figures during a decennial census. Instead, it prohibits only 'the use of the statistical method known as "sampling."' 13 U.S.C. § 195." *Id.* The court "conclude[d] that statistical sampling and imputation are separate statistical methodologies and that they were viewed as such at the time of the enactment of § 195." *Id.* The district court quoted with approval *Orr v. Baldrige*, No. IP-81-604-C (S.D. Ind. Feb. 7, 1982) (holding that imputation is not a form

of sampling). (J.S. 19a-20a.)[5] The court summarized its conclusion:

> Sampling is the technique of determining the traits of the entire population by collecting and analyzing data from a representative segment of that population. In hot deck imputation, on the other hand, there is no representative sample from which to infer the characteristics of the larger population. Instead, a single, fully enumerated housing unit is used to draw conclusions about a neighboring housing unit for which data is missing. That is, imputation is used to fill in missing data on the assumption that similar types of dwellings in the same geographic area will have similar characteristics.

(J.S. App. at 20a) Because imputation is not a form of sampling forbidden by § 195, Utah's reliance on *House of Representatives*, 525 U.S. 316 (1999), was misplaced. (J.S. App. at 21a)

Finally, the district court rejected Utah's claims under the Census Clause and the Fourteenth Amendment of the Constitution, noting that "the Constitution provides that the decennial censuses shall take place 'in such Manner as [Congress] shall by Law direct.' *Id.* at art. I, § 2, cl .3" (J.S. App. at 24a) Congress has delegated its authority to the Secretary of Commerce, whose discretion " 'need bear only a reasonable relationship to the accomplishment of an actual

[5] The Order in *Orr* is attached as Exhibit A to the Consolidated Memorandum in Support of Defendants' Motion to Dismiss or, in the Alternative, Their Cross-Motion for Summary Judgment and in Opposition to Plaintiffs' Motion for Summary Judgment (hereinafter "U.S. Mem.").

enumeration of the population, keeping in mind the constitutional purpose of the census' " *Id.* (quoting *Wisconsin*, 517 U.S. at 20). The court ruled the use of imputation to be "reasonably consistent with the accomplishment of an actual enumeration of the population." (J.S. App. at 25a) The court noted that the taking of the census is an enormous and complex undertaking. Agreeing with the *Orr* court that "some type of imputation must take place by practical necessity, whether it is the imputation of statistically plausible values for the missing data or the imputation of a zero," the district court concluded that "[t]he latter approach appears clearly inconsistent with the constitutional imperative of an actual enumeration." *Id.*

The court held that the "exalted meaning" that Utah would ascribe to the words " 'actual enumeration' fails when that term is considered in the context of the entire text of Article I and the history of the Census Clause." *Id.* The court stated, "the text of Article I, when read in conjunction with the proceedings of the Constitutional Convention, [makes clear] that the first apportionment of the House of Representatives was necessarily based on the grossest of estimates. *See* U.S. Const. art. I, § 2; 1 Max Farrand, Records of the Federal Convention of 1787, at 578-79 (1927) (explaining that delegates to the Constitutional Convention recognized that the first apportionment would be based on a 'conjectural ratio')." *Id.* at 25a-26a. The court concluded that "[t]he constitutional requirement of an enumerative census was simply to distinguish that process from the conjectural apportionment of the first Congress" and noted that "the phrase 'actual enumeration' . . . was added by the Committee of Style and Arrangement, a committee which did not operate to alter the

substance of any of the resolutions passed by the Constitutional Convention. *Cf. Nixon* [*v. United States*, 506 U.S. 224, 231 (1993).]" *Id.* at 26a. The court declared that it was "simply unwilling to adopt the draconian interpretation Plaintiffs would have us ascribe to 'actual enumeration'." *Id.*

Judge Greene concurred that the Census Act issue is justiciable (J.S. App. at 28a), but disagreed with the majority's conclusion that imputation is a statistical methodology separate and distinct from sampling. (J.S. App. at 30a)

Utah timely filed its notice of appeal on 5 November 2001. (J.S. App. at 35a-36a.)

B. STATEMENT OF FACTS

The delegates to the Constitutional Convention in 1787 agreed after extended and acrimonious debate between the large States, which demanded representation based on the population of the several States, and the small States, which insisted on equal representation of States, to a bicameral legislature with one house based on population and the other on equal representation of States. The delegates decided that the population would be determined by a census or numbering of the people and so provided in the Constitution.

Pursuant to its constitutional mandate, Congress has adopted legislation to implement the taking of the decennial census. The First Congress enacted legislation that required the census takers to make "a just and perfect enumeration" of every person within their assigned division. Act of Mar. 1, 1790, § 1, 1 Stat. 101. The enumerator had to prepare a schedule, listing every person within the division by family name. *See id.* at

101-102. In 1810, Congress amended the Census Act to provide expressly that "the said enumeration shall be made by an actual inquiry at every dwelling-house, or of the head of every family within each district, and not otherwise." Act of Mar. 26, 1810, § 1, 2 Stat. 565. In 1850, Congress permitted the enumerators to obtain the required census information from "some member of each family, if any one can be found capable of giving the information, but if not, then of the agent of such family." Act of May 23, 1850, § 9, 9 Stat. 430. By the Act of Mar. 3, 1919, § 12, 40 Stat. 1296, Congress allowed the enumerators to obtain information from neighbors if no household member could be found. *See House of Representatives*, 525 U.S. at 335-36 and 335 n.5; Declaration of Howard Hogan ("Hogan Decl.") ¶ 11.[6] In 1964, Congress repealed the requirement in the Census Act that enumerators must obtain the required data by visiting each household; consequently in the 1970 Census, the Bureau initiated the "mail-out/mail-back" enumerating procedure. *See* 525 U.S. at 337; Hogan Decl. ¶ 42.

In conducting the 2000 census, the Census Bureau employed imputation as one part of the process of determining the total apportionment population for all States. Imputation is a method of coping with missing, incomplete, or inconsistent data. It is applied when missing data are known or reasonably believed to be correlated with the observed or known data and capitalizes on that correlation to produce plausible values for the missing data. (Declaration of David W. Peterson ("Peterson

[6] The Hogan Declaration was submitted in support of U.S. Mem.

Decl.") ¶¶ 6, 10; N.C. App. 1a, 3a.)[7] Imputation, as the term is used by the Census Bureau, refers to "providing responses for missing items by using not only other information for the person or household, but also information from other, similar persons or households." Constance F. Citro, *Editing and Imputation*, in ENCYCLOPEDIA OF THE U.S. CENSUS (Margo J. Anderson ed., CQ Press), at 195-96 (A.R. C 00428-430).

The Census Bureau regards imputation as a traditional part of its methodology in taking the census. Imputation has been used by the Bureau since the 1940 census when it used the process to fill in unknown ages. In the 1950 census, the Bureau used imputation to provide other missing characteristics of enumerated persons. The 1960 census, the first to make extensive use of computers, was also the first to use imputation to add persons to the apportionment count. Imputation was used where housing units were known to exist but the number of occupants in those units was unknown. This statistical process is known as "hot deck" imputation, because household data were processed sequentially by location and the data were stored sequentially in a file. Where occupancy or population data were incomplete, the computer drew from the "hot deck," or the closest sequential data. (Hogan Decl. ¶ 16)

The 1980 census used imputation not only to assign population to housing units where the number of occupants was unknown, but also to assign a status (vacant or occupied) to a housing unit. The 1990 census was similar, but also used imputation to assign a status (vacant/delete/non-existent) where despite evidence that an identified unit actually existed, a lack

[7] The appendix to North Carolina's motion is referred to as N.C. App. ___.

of data made it unclear whether the unit should be deleted as non-existent. The 2000 census was similar to the 1990 census in that imputation was used to assign a status (existent/non-existent) where the existence of a unit identified on the master address file could not be verified, to assign occupancy status (vacant/occupied) when it could not be verified that an identified unit was occupied in fact, and to assign population where the number of inhabitants of an occupied unit could not be verified. There was some basis for believing that every unit on the master address list actually existed. (Defendants' Supplemental Objections and Responses to Plaintiffs' Revised First Set of Interrogatories and Requests for Production of Documents at 4-15, N.C. App 9a-22a; Hogan Decl. ¶¶ 11, 14, 39-76)

The statistical method known as "sampling" is a methodology different and distinct from imputation. Sampling is generally understood to be a process where a sample is drawn at random from a well-defined target population, and every member of the target population has an equal chance of being included in the sample. (Peterson Decl. ¶ 7, N.C. App. 1a-2a) The imputation process used by the Bureau in the 2000 census does not involve random selection; it is a deterministic process. In this sense, it lacks one of the attributes commonly associated with statistical sampling. Additionally, the Bureau's imputation process is focused specifically on assigning data values to individual members of the population, rather than estimating overall population parameters. In this respect, too, it differs from the common conception of statistical sampling. (Peterson Decl. ¶ 9, N.C. App. 2a-3a)

Congress first addressed the issue of "sampling" with respect to the census in 1957, when the Secretary of Commerce requested an amendment to the Census Act to permit the Bureau to use statistical sampling in gathering various components of census information.[8] This resulted in the enactment of the original version of § 195, where the first reference to "sampling" in the Census Act occurred: "except for the determination of population for apportionment purposes, the Secretary may, where he deems it appropriate, authorize the use of the statistical method known as 'sampling' in carrying out the provisions of this title. 13 U.S.C. § 195 (1970 ed.)." *See House of Representatives,* 525 U.S. at 337, 351. In 1976, Congress amended § 195 to provide that "the Secretary shall, if he considers it feasible," use sampling, but still prohibited the use of sampling for apportionment purposes.

Responding to perceived problems in the 1990 census, Congress enacted legislation that directed the National Academy of Sciences to study means to improve the accuracy of the census. In the *1997 Report to Congress,* the Bureau proposed to use sampling in three programs to supplement, but not replace, the traditional means of enumeration; however, after this Court's decision in *House of Representatives* in 1999, the Bureau abandoned its plan to use "sampling" in conducting the census. The Bureau continued to use the well-established practice of imputation along with other statistical methodologies in its 2000 Census. (Hogan Decl. ¶¶ 61-64)

[8] *See* Amendment of Title 13, United States Code, Relating to Census: Hearing on H.R. 7911 before the House Committee on Post Office and Civil Service, 85th Cong., 1st Sess., 4-8 (June 19, 1957).

The 2000 census was conducted on April 1, 2000. Pursuant to the requirements of 13 U.S.C. § 141(b), the Census Bureau tabulated the apportionment count and reported to the President within nine months after the census date, in this case on December 28, 2000. The President transmitted the apportionment calculation to Congress on January 4, 2001; it was received by the House of Representatives on January 5, 2001. *See* 2 U.S.C. § 2a(a) (2001). The Clerk certified the apportionment to the States on January 16, 2001. North Carolina was apportioned thirteen Representatives, an increase of one over her previous apportionment. (N.C. App 26a) Utah's apportionment was unchanged.

ARGUMENT

I. THE COURT IS WITHOUT AUTHORITY TO REASSIGN A CONGRESSIONAL REPRESENTATIVE FROM NORTH CAROLINA TO UTAH.

Utah seeks to have this Court issue an injunction which would, presumably, effect a reallocation of one Representative from North Carolina to Utah. The district court, relying on *Franklin*, held that Utah's request for declaratory and injunctive relief is justiciable. (J.S. App. at 12a) North Carolina submits that the courts may grant prospective declaratory relief for future censuses but cannot revise a completed apportionment without infringing upon the duty and authority regarding apportionment given by the Constitution to Congress.

The duty and authority of enumeration and apportionment is given by the Constitution to Congress. U.S.

CONST. art. I, § 2, and amend. XIV, § 2. The United States Code provides that it is the responsibility of the President to transmit to the Congress, within one week of the opening of each fifth Congress, a statement "showing the whole number of persons in each State . . . as ascertained under . . . [the] decennial census of the population, and the number of Representatives to which each State would be *entitled* under an apportionment of the then existing number of Representatives." 2 U.S.C. § 2a(a) (2001) (emphasis added). The concept of entitlement is reiterated in the next subsection and in later sections of the United States Code:

> (b) Each State shall be *entitled* . . . to the number of Representatives shown in the statement required by subsection (a) of this section, no State to receive less than one Member. It shall be the duty of the Clerk of the House of Representatives, within fifteen calendar days after the receipt of such statement, to send to the executive of each State a certificate of the number of Representatives to which such State is *entitled* under this section.

2 U.S.C. § 2a(b) (2001) (emphasis added). *See also* 2 U.S.C. §§ 2b and 2c (2001).

"In its usual sense, to entitle is to give a right or legal title to." BLACK'S LAW DICTIONARY 532 (6th ed. 1990). When the President provided his statement to Congress that North Carolina "would be entitled" to thirteen Representatives, that "action . . . create[d] an entitlement," a legal right on the part of North Carolina "to a particular number of Representatives and ha[d] a direct effect on the reapportionment" of members of

Congress. *Franklin*, 505 U.S. at 797. This entitlement was formally attested to when the Clerk of the House of Representatives certified:

> Pursuant to the provisions of Title 2, United States Code, Section 2a (b), that the State of North Carolina *shall be entitled*, in the One Hundred Eighth Congress and in each Congress thereafter until a subsequent reapportionment shall take effect under applicable statutes, to thirteen representatives in the House of Representatives of the Congress of the United States.

(N.C. App. 25a-26a (emphasis added))

Even more problematic and speculative than the issue of whether the President would transmit a new calculation to the Clerk of the House of Representatives is what Congress would do upon receipt of such a new calculation. This Court assumed in *Franklin* that "it is substantially likely that the President and other executive and congressional officials would abide by an authoritative interpretation of the census statute and constitutional provision by the District Court, even though they would not be directly bound by such a determination." 505 U.S. at 803; *but see id.* at 829, Scalia, J., dissenting ("Unless the other branches are to be entirely subordinated to the Judiciary, we cannot direct the President to take a specified executive act or the Congress to perform particular legislative duties.").

A new apportionment cannot be accomplished without Congressional action. That Congress has reserved to itself the right to determine apportionment is manifest in the text of 2 U.S.C. § 2a(b): "Each State shall be entitled, in the Eighty-third Congress and in each Congress thereafter until the taking effect

of a reapportionment *under this section or subsequent statute*, to the number of Representatives shown in the statement required by subsection (a) of this section." (emphasis added).

Utah argues in the instant case that a judicial holding that one Representative should be taken from North Carolina and allocated to her would affect no other States. But such a decision would usurp the power allocated separately to Congress by the Constitution. Although the courts can hold that a method of apportionment adopted by Congress does not meet constitutional requirements, *see Department of Commerce v. Montana*, 503 U.S. 442 (1992), the courts simply cannot arrogate to themselves the authority to revise an apportionment already certified by Congress.

The United States Code could not be more clear: the statement of the President, certified by the Clerk of the House of Representatives, *entitles* North Carolina to thirteen Representatives. Absent action by Congress to revoke its allocation, the judiciary lacks jurisdiction or authority to reapportion the Representatives in Congress between North Carolina and Utah. The only remedy available to Utah, assuming any merit can be found in her claims, is declaratory, prospective relief – looking to the next decennial census and apportionment.

II. THE DISTRICT COURT CORRECTLY HELD THAT THE USE OF IMPUTATION IN THE 2000 APPORTIONMENT COUNT IS NOT "THE STATISTICAL METHOD KNOWN AS 'SAMPLING'" PROHIBITED BY THE CENSUS ACT.

Utah's primary argument is that imputation is a form of sampling and that sampling, in its broadest sense is forbidden by § 195 of the Census Act. Utah's contrived and artificial arguments that sampling and imputation are the same statistical tool and are interchangeable concepts must be rejected for at least four reasons: (1) the express language of the statute does not refer to imputation; (2) the statute's use of the word "sampling" is technical in nature and must be interpreted in light of the relevant science or methodology; (3) the legislative history of § 195 evinces no intent to deal with any statistical method other than sampling; and (4) the Census Bureau has consistently treated sampling and imputation as unrelated statistical procedures, each based on a separate science.

The sole question before the Court with respect to §195 is whether the phrase "the statistical method known as 'sampling'" encompasses the statistical method for coping with missing data known as "imputation." The answer is plainly "no." It is a well-established canon of statutory construction that "the starting point for interpreting a statute is the language of the statute itself. Absent a clearly expressed legislative intention to the contrary, that language must ordinarily be regarded as conclusive." *Consumer Product Safety Comm'n v. GTE Sylvania, Inc.*, 447 U.S. 102, 108 (1980). In ascertaining the plain meaning of the language, however, the court "should

not read with blinders on -- context matters." *Smith v. Zachary*, 255 F.3d 446, 453 (7th Cir. 2001) (Williams, dissenting) (citing *Robinson v. Shell Oil Co.*, 519 U.S. 337, 340-41 (1997)). Imputation is not prohibited by the plain language of § 195.

Assuming *arguendo* that more than one reading of the literal text of the statutory phrase at issue were possible, a review of a statute's legislative history is a traditional tool for revealing the intent of Congress. *See Chevron U.S.A., Inc. v. Natural Resources Defense Council*, 467 U.S. 837, 859-63 (1984); *Timex V.I. v. United States*, 157 F.3d 879, 882 (Fed. Cir. 1998). The legislative history of § 195, when originally enacted in 1957 and amended in 1976, is replete with references to the conventional understanding of statistical sampling as a random sample using some percentage of the total population from which to make projections about the total population. (Peterson Decl. ¶¶ 13-20, N.C. App. 4a-9a) Nothing in the legislative history suggests the prohibition in § 195 was meant to include statistical methodologies in general or imputation in particular.

In this case, the bare words do not reference imputation, nor does the prohibitory language attempt to broadly encompass statistical methodologies generally.[9] Instead, the statute refers only to the statistical methodology *known* as sampling. To

[9] Compare the language of H.R. 1469, tit. VIII(b)(1), at 65, when Congress attempted in 1997 to amend 13 U.S.C. § 141(a) to provide that "[n]otwithstanding any other provision of law, no sampling or any other statistical procedure, including any statistical adjustment, may be used in any determination of population for purposes of the apportionment of Representatives in congress among the several States." Although this bill was vetoed by the President, and so never became law, it shows Congress knew how to extend the prohibition beyond "sampling." *See* U.S. Mem. at 30 (Response to Plaintiffs' Statement of Material Facts ¶ 28).

answer the question "known by whom," it must be understood that the phrase appears in the context of census taking. The simplest meaning of the statute's reference is to the statistical method known as sampling by the Census Bureau, and its demographers and statisticians. The conventional understanding of sampling in the context of demographic and population survey applications is the statistical methodology of probability or random sampling, where every member of the target population has a known, non-zero probability or chance of selection. *See* Hogan Decl. ¶ 30. *See also* A.R. C01167-68; U.S. Mem., Exhibit. H (Defendants' Interrogatory Answers in *Orr v. Baldrige*); Peterson Decl. ¶¶ 6-8, N.C. App. 1a-2a. Plaintiffs' expert, Dr. Donald B. Rubin, has in the past *agreed* with this definition or understanding of sampling by the Census Bureau. *See* U.S. Mem., Exhibit G (Affidavit of Rubin in *Orr*) ¶ 5. *See also* U.S. Mem., Exhibit H. Because sampling has an understood and accepted meaning in the area of census or survey applications, it is a "technical term." And where Congress has used technical words or terms of art, they must be understood or interpreted by reference to the art or science to which they apply. *Corning Glass Works v. Brennan*, 417 U.S. 188, 201-02 (1974). *See also* NORMAN J. SINGER, STATUTES AND STATUTORY CONSTRUCTION § 47:29, 358-59 (rev'd 2000) (footnotes omitted) ("In the absence of legislative intent to the contrary, or other overriding evidence of a different meaning, technical terms or terms of art used in a statute are presumed to have their technical meaning.").

Statistical sampling and imputation are separate and distinct statistical methodologies -- each based on its own science and serving different purposes. Imputation deals with

the data processing problem of missing, discrepant, or improperly processed data. It is a valid, well-known and widely used science. *See* Peterson Decl. ¶ 10, N.C. App. 3a; Hogan Decl. ¶¶ 8, 16, 23, 24, 31, 51. Plaintiff's own expert has written extensively on the method, calling it "about the only practically possible method for handling nonresponse." (U.S. Mem., Exhibit D (*Multiple Imputations in Sample Surveys*) at 2) When occupancy or population data for a particular housing unit are incomplete, missing or conflicting, individual data components are imputed premised on local homogeneity. Essentially, similar housing units in close geographic proximity are used as a proxy. The homogeneity assumption that underlies the Census Bureau's imputation technique is well supported in practice, academic literature, and logic.

Since 1960 the Census Bureau has consistently applied imputation techniques for purposes of determining the apportionment and considers it part of the traditional census enumeration. In addition, the use of imputation has been regularly reported to Congress. *See also* Hogan Decl. ¶¶ 11, 63. In view of the extensive oversight provided by Congress to the Bureau's conduct of the census, the failure by Congress to amend § 195 to include a prohibition against imputation speaks volumes. It is well established that "the construction of a statute by those charged with its execution should be followed unless there are compelling indications that it is wrong, especially when Congress has refused to alter the administrative construction." *CBS, Inc. v. FCC*, 453 U.S. 367, 382 (1981) (quoting *Red Lion Broadcasting Co. v. FCC*, 395 U.S. 367, 381 (1969) (footnotes omitted)). *See also Zemel v. Rusk*, 381 U.S. 1, 11 (1965) (Congress' failure to repeal or reverse a statute in

the face of an agency's repeated interpretation is "persuasive evidence that that interpretation is the one intended by Congress").[10]

Moreover, to the extent § 195 is susceptible of more than one meaning, the Census Bureau is entitled to substantial deference under *Chevron*. Indeed, because the Census Clause delegates to Congress the authority to direct the taking of the census and Congress has delegated this authority to the Secretary of Commerce and the Census Bureau, exceptional deference must be accorded when the courts review the Bureau's decisions about the form and content of the census. *See Wisconsin*, 517 U.S. at 19 ("Constitution vests Congress with virtually unlimited discretion" in taking the census).

House of Representatives does not advance Utah's cause. Although sampling is not defined in the opinion, the proposed statistical sampling methods considered by the Court were classic examples of probability sampling using random selection techniques. *See* 525 U.S. at 324-25. Nothing in the opinion extends the meaning of the prohibitory phrase to include statistical methods generally or imputation specifically. Without disagreement from the other justices, Justice Breyer noted that because imputation had been utilized to some degree for the last 50 years, § 195 "could not have been intended as a prohibition so absolute as to stop the Census Bureau from imputing the existence of a living family behind the closed doors of an apparently occupied house, should that family refuse to answer the bell." *Id.* at 355.

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[10] It is implausible to suggest that Congress was not aware that Indiana lost a seat to Florida as a result of the Bureau's use of imputation in the 1980 census or that it was unaware of the outcome of the legal challenge to imputation in *Orr v. Baldridge*.

Utah maintains, without support, that the district court's construction of § 195 would authorize the Bureau to circumvent this Court's holding in *House of Representatives*. (J.S. at 15) First, there is no evidence that the Bureau has ever attempted or would ever attempt to manipulate the results of the census as Utah suggests. Even the use of sampling struck down in *House of Representatives* was an academically endorsed proposal intended to make the census more accurate. Second, Congress, which closely supervises the Bureau's conduct of the census, would not permit a haphazard and non-exhaustive attempt to count the people. Because the Census Clause vests in Congress the responsibility to direct the taking of the census, there is no need for a judicially imposed prophylactic measure intended to prevent some hypothetical attempt to manipulate the Census. Indeed, post-census challenges like the present one offer a greater opportunity for manipulation of the census count when the losing State requests a recount in its favor by tailoring the elimination or the addition of some group.

In light of the express language of § 195 and its legislative history, as well as the longstanding use of well-recognized imputation techniques by the Census Bureau, the district court correctly concluded that Congress never intended § 195 to encompass imputation.

III. THE DISTRICT COURT CORRECTLY HELD THAT THE CONSTITUTION VESTS CONGRESS WITH VIRTUALLY UNLIMITED DISCRETION TO DIRECT HOW AN ACTUAL ENUMERATION SHALL BE CONDUCTED AND DOES NOT PROHIBIT THE USE OF IMPUTATION TO IMPROVE ITS ACCURACY.

Utah asserts that the use of imputation is prohibited by the words "actual enumeration" in the Census Clause.[11] The history of the Census Clause demonstrates that Utah's interpretation of the Clause is not correct. Article I, sec. 2, cl. 3, provides in pertinent part:

> The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct.

The most divisive issue confronting the delegates to the Constitutional Convention was how to apportion representation among the States. The contentious question was resolved when the Convention voted to adopt the "Great Compromise," proposed by Roger Sherman of Connecticut, that the legislature should be bicameral with the House of Representatives based on population and the Senate on equal representation of the States. *See generally,* Catherine Drinker Bowen, MIRACLE AT PHILADELPHIA; THE STORY OF THE CONSTITUTIONAL CONVENTION MAY TO SEPTEMBER 1787 (1966) at 84, 86, 94-96,

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[11] In *House of Representatives*, this Court held that the Census Bureau's plan to use statistical sampling to supplement the apportionment count violated § 195 of the Census Act, but the majority opinion did not attempt to interpret the Census Clause.

185-87. The delegates resolved that the allocation of Representatives in the first House would be based on the "conjectural ratio" used by the Continental Congress to apportion the expenses of the Revolutionary War among the States. 1 MAX FARRAND, RECORDS OF THE FEDERAL CONVENTION OF 1787, at 578-79 (1911)

The Framers debated whether it should be left to the discretion of Congress to reapportion itself thereafter as the proportionate population of the several States should change from time to time. *Id.* at 559. Edmond Randolph of Virginia proposed that "instead of leaving it in the discretion of the Legislature, to regulate the representation by a periodical census." *Id.* at 561, 567. He moved to amend a committee report to include the following language: "that in order to ascertain the alterations in the population & wealth of the several States, the Legislature should be required to cause a census, an estimate to be taken within one year after its first meeting; and every ___ years thereafter - and that the Legislature arrange the representation accordingly." *Id.* at 570-71.

North Carolina's Hugh Williamson moved to postpone Randolph's motion and to consider in its place the following:

> that in order to ascertain the alterations that may happen in the population & wealth of the several States, a census shall be taken of the free white inhabitants and 3/5ths of those of other descriptions on the 1st year (after this Government shall have been adopted) and every __ year thereafter; and that the Representation be regulated accordingly.

Id. at 575-79.

Randolph consented to Williamson's motion, but he further insisted, "The census must be taken under the direction of the General Legislature. The States will be too much interested to take an impartial one for themselves," *Id.* at 579-80. Madison later explained that to assure accuracy in the count, *i.e.*, to prevent exaggeration of the count by the States, the apportionment of taxes would be according to population. THE FEDERALIST No. 54, at 340 (James Madison).

The Convention considered alternatives and approved the following resolution:

> Resolved that a Census be taken within six years from the first meeting of the Legislature of the United States and once within the term of every Ten years afterwards of all the inhabitants of the United States in the manner and according to the ratio recommended by Congress in their resolution of April 18, 1783[12] – and that the Legislature of the U.S. shall proportion the direct taxation accordingly.

1 FARRAND at 590-91. By the first week of September, the Convention had agreed to all the provisions of the Constitution in substance. The resolutions adopted were submitted to a Committee of Style and Arrangement. BOWEN at 234. Its final product is the present version of article 1, section 2, clause 3.

The notes of the Constitutional Convention reveal that the delegates, having decided the apportionment of the House of Representatives would be based on the respective

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[12] *See* JOURNALS OF THE CONTINENTAL CONGRESS 1774-1789, at 191 (Gaillard Hunt ed., Government Printing Office 1922) (1783).

populations of the several States and that the population would be determined by a census, did not bother to discuss how the census would be taken. Details of the implementation, such as how the census would be conducted, are not to be found in the Constitution. The Framers followed Randolph's view that "only essential principles should be inserted [in a constitution], lest government be clogged by permanent, unalterable provisions, which ought to be shaped to later times and events." BOWEN at 197 (paraphrasing and quoting a document in Randolph's handwriting found among George Mason's papers).

The Framers of the Constitution specifically placed responsibility to direct the taking of the census in the hands of Congress. The "actual Enumeration . . . shall be made in such Manner as [*Congress*] shall by Law direct." U.S. CONST. art. I. § 2, cl. 3. During the debates the delegates spoke about a "census" or "numbering of the people." The words "actual Enumeration" were substituted for "census" by the Committee of Style. The Committee of Style had no authority to alter the resolutions passed. The Committee's duty was to put the various provisions in an orderly arrangement and rephrase the language as might be appropriate. *See Nixon v. United States*, 506 U.S. 221, 231 (1993) ("accepting as we must the proposition that the Committee of Style had no authority from the Convention to alter the meaning of the Clause, *see* 2 [FARRAND, at 553], we must presume that the Committee's reorganization or rephrasing accurately captured what the Framers meant in their unadorned language"). *See also Powell v. McCormack*, 395 U.S. 486, 538-39 (1969).

Citing *Nixon*, 506 U.S. at 231-32, Utah urges that "actual Enumeration," even though a product of the Committee of

Style, has substantive meaning different from "census" or "numbering."[13] That the Constitution uses "Enumeration" as opposed to "census" is of no import. Article 1, section 9, clause 4 of the Constitution provides: "No Capitation, or other direct, Tax shall be laid, unless in Proportion to the Census or Enumeration herein before directed to be taken." Hamilton in *The Federalist Papers* refers to "[a]n actual census or enumeration" which will be the basis for assessment of direct taxes upon the States. THE FEDERALIST No. 36, at 220 (Alexander Hamilton). Possibly, enumeration was substituted for census because census once meant "the registering of Roman citizens and their property, registered property, wealth." 2 OXFORD ENGLISH DICTIONARY 1031 (2d ed. 1989). Because the Framers decided that the calculation of wealth was too inexact and since the word "census" had taxing and wealth connotations, the Committee of Style may have substituted "enumeration" for "census," as a more precise term. By 1769, the current usage of census as "[a]n official enumeration of the population of a country or district, with various statistics relating to them" was being employed. *Id.*

"Actual" in the phrase "actual Enumeration" distinguishes the initial allocation of Representatives in the Census Clause by the use of a "conjectural ratio" of population from the "*actual*" enumeration, the taking of the census that would take place after the meeting of the first Congress. The "actual Enumeration" would be based solely on population, determined as accurately as possible by a census. Nothing in

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[13] *Nixon* does not help Utah. Plaintiff in *Nixon* asked the Court to ignore the word "sole" in art. I, § 3, cl. 6, added by the Committee of Style. 506 U.S. at 231. North Carolina does not ask this Court to ignore any word in the Census Clause.

the records of the Constitutional Convention suggests that the adjective "actual" was meant to specify how the enumeration was to be accomplished.

The district court rightly rejected Utah's "draconian interpretation" of the phrase "actual enumeration." (J.S. App. at 26a) Utah would have this Court decree that the Census Bureau ignore every person it reasonably believes to exist but who cannot be enumerated. (J.S. at 23) Such an interpretation runs counter to the idea of an "actual Enumeration," as contemplated in the Census Clause. *See Wisconsin*, 517 U.S. at 6 ("each [census] was designed with the goal of accomplishing an 'actual Enumeration' of the population"). Not to count such a person also conflicts with the Fourteenth Amendment concept of equal representation. *See Montana*, 503 U.S. at 463.

Utah points to the concurring opinion in *House of Representatives*, 525 U.S. at 344, Scalia, J., which states that federal courts might be called upon to select among competing methods of estimation. Justice Scalia's fear that the use of statistical techniques in the Census might some day compel the Court "to determine which [estimation technique would] so obviously create[] a distortion that it cannot be allowed" and that having to make such determination would give rise to a "new specialty of 'Census Law,' " *id.* at 349 (emphasis omitted), is not likely to be realized by the use of imputation presented in this case. First, it is the responsibility of Congress to determine how the census will be conducted. *Wisconsin*, 517 U.S. at 15 (citing *Franklin*, 505 U.S. 788) ("the Constitution vests Congress with wide discretion over reapportionment decisions and the conduct of the census"). Second, where there

are several reasonable alternative methods, courts need not interfere with Congress's judgment as to which method to employ. *See, e.g., Montana*, 503 U.S. 442 (Congress's determination of apportionment method is reviewable but due great deference). Even if a federal court were required to review a statistical method, courts are often called upon to assess the opinions of experts. *See, e.g.*, FEDERAL RULE OF EVIDENCE 702 (2001) and *Daubert v. Merrell Dow Pharms.*, 509 U.S. 579 (1993) (courts must act as gatekeepers to exclude unreliable expert testimony). *See also*, *supra* at 19-20.

Plaintiffs' argument that "the Framers knew the difference between population counts derived from estimates and those based on a person-by-person count using first-hand data" (J.S. at 24) is both misleading and a red herring. It is misleading because it implies that the delegates to the Constitutional Convention considered estimating the population as an option. It is clear that by using the phrase "actual Enumeration" the Framers contemplated nothing other than the taking of a census. The only reference to an "estimation" had to do with whether wealth should be taken into account. At best, the wealth of the States could only be "estimated," and eventually the Framers rejected the idea.[14]

Utah's discussion of the Framers' rejection of estimation in determining the population is also a red herring. No one contends that the Framers intended, or that the Constitution permits, an unscientific approximation of the country's

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[14] The records of the Convention show without question that references in the debates to using estimations were all related to calculating wealth. *See* 1 FARRAND, at 561, 582, 583.

population in some manner unrelated to taking a census. The Framers certainly expected that the census would be taken by counting the people in such manner as Congress shall direct. Utah equates estimation, as discussed by the Framers, however, with the process of imputation, thereby contending that the Constitution forbids the latter as well as the former. To estimate the population is to make an approximate judgment as to its size. To use imputation with respect to the census is to employ a scientific method to improve the accuracy of the enumeration of our citizens. (Peterson Decl. ¶ 11, N.C. App. 3a-4a)

It is not reasonable that the Constitutional Convention meeting at the close of the Age of Enlightenment, and including delegates such as Franklin, Rush, and, Hamilton, would have closed the door to advances in science and mathematics in carrying out the provisions of the Constitution. Since the science of statistics was only nascent in the Eighteenth Century,[15] it is improbable that the Framers considered the use of statistical methods for taking the census. The absence of anything in the records of the Convention indicates assuredly that they did not. Instead, the Framers provided for the population to be determined in the manner directed by Congress. For the first census, the population was determined by the best means available at that time to achieve "a just and perfect enumeration," *House of Representatives*, 525 U.S. at 335 – a house-to-house count.

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[15] Statistics as a separate scientific discipline was not recognized until the Twentieth Century. STEPHEN M. STIGLER, HISTORY OF STATISTICS: THE MEASUREMENT OF UNCERTAINTY BEFORE 1900 (1986) at 1. *See also*, 25 ENCYCLOPEDIA AMERICANA 629, 634-35 (2001).

Congress has never required a nose count of every individual as Utah contends. *See* J.S. at 20. From the first census, Congress has allowed data to be obtained from persons other than the individual being counted. At first the number of residents was obtained from the head of the household. (Hogan Decl. ¶ 11) If this could not be accomplished, the information could be obtained from other people and sources likely to have the necessary information, such as agents of the family or neighbors. In the 1960 census, the Bureau, with the approval of Congress, began to use the "mail out/mail back" enumerating procedure. Imputation is but another step, albeit a statistical one, in this evolving process to improve the accuracy of the census. Just as the enumerators were allowed to obtain population data from neighbors when the information could not be obtained by visits to the household, imputation employs data obtained from the "nearest housing unit" actually visited by the enumerators, where the characteristics of that unit are sufficiently similar to the unit from which data was not directly available.

Finally, to read the phrase "actual Enumeration" as defining the process for taking the census is to ignore the substantive provisions of the remainder of the sentence. The Census Clause specifies that (1) there will be an "actual Enumeration" (by the taking of a census used to allocate representation in the first Congress), (2) that the "actual Enumeration" shall be conducted within three years of the first meeting of Congress, (3) and that the enumeration shall be "made . . . in such Manner as [Congress] shall by Law direct." To employ imputation in counting the people is a reasonable and constitutional means to achieve an accurate census count.

In sum, the court below correctly held that the Constitution empowers Congress to determine how the census shall be taken and does not preclude the use of imputation if Congress so desires. To use imputation is within the constitutional discretion of Congress and within the discretion delegated to the Census Bureau.

CONCLUSION

For the foregoing reasons, North Carolina's motion to affirm the decision of the district court, or, in the alternative, to dismiss Utah's appeal should be granted.

Respectfully submitted,

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DECLARATION OF DAVID W. PETERSON, PHD (EXCERPTS)

[Caption Omitted in Printing]

6. Although neither of these definitions is incorrect, each leaves unstated several important characteristics that usually accompany a discussion of statistical sampling. Here are some definitions of sampling and samples put forth by other statisticians:

> [S]tatistical samples … are samples selected by a specified random process. (Williams, A SAMPLER ON SAMPLING, p. 44.)

> A sample survey may be defined as a study involving a subset (or sample) of individuals selected from a larger population. Variables or characteristics of interest are observed or measured on each of the sampled individuals. These measurements are then aggregated over all individuals in the sample to obtain summary statistics (e.g., means, proportions, totals) for the sample. It is from these summary statistics that extrapolations can be made concerning the entire population. (Levy & Lemeshow, SAMPLING FOR HEALTH PROFESSIONALS, pp. 1-2.)

7. As the first of these definitions suggests, there is usually an element of randomness associated with the sampling process. In statistics classes, the subject of sampling is almost always introduced using an example in which the sample is drawn at random from a certain well-defined target population. Prior to the drawing of the sample, every member of the target population has an equal chance of being included in the sample. If the drawing is done one subject at a time, after each draw each remaining member of the population has an equal chance of being selected on the next. This is called simple random sampling. It can be made more complicated by

dividing the population up into sub-units, and drawing a simple random sample from each – the resulting combined sample is called a stratified sample. Or one can draw the sample randomly from the population in such a way that some members always have a greater chance of being selected at each stage than do others – this type of sample is called a probability sample. The main point here is that usually when one thinks of or engages in statistical sampling, it involves random sampling from some population. Were the activity to be repeated in its entirety, it is very likely that a different sample would be drawn, due to the randomness inherent in the process.

8. As the second of these definitions suggests, statistical sampling is usually done for the purpose of estimating some average or proportion that is characteristic of an entire population. One might for example measure the heights of a randomly chosen group of undergraduate students for the purpose of estimating the average height of undergraduates generally. The sample would not typically be used, for example, to estimate or impute the heights of individual students not included in the sample.

About Imputation

9. The imputation process used by the Bureau of the Census in the 2000 census does not involve random selection; it is a deterministic process. In this sense, it lacks one of the attributes commonly associated with statistical sampling. Additionally, the Bureau's imputation process is focused specifically on the assignment of data values to individual members of the population, rather than to estimation of overall population parameters. In this respect, too, it differs from the common conception of statistical sampling.

10. Imputation is a method for coping with survey data that are only partially complete. It is applicable in cases in which the missing data are known (or reasonably believed) to be correlated with the observed or known data, and it capitalizes on that correlation to produce plausible values for the missing data. Imputation is not an alternative to simple random sampling; it is a procedure with a different purpose directed to solving a different problem. Imputation is well-known and widely used. Dr. Rubin devotes a section in his book STATISTICAL ANALYSIS WITH MISSING DATA (Roderick J. A. Little & Donald B. Rubin, Wiley 1987, pp. 62 *et seq.*) to imputation, and discusses there (with numerous references to pre-existing literature) not only hot deck imputation but specifically the nearest-neighbor form of hot deck imputation used by the Bureau of the Census in the 2000 census. The topic is discussed as well in Barry L. Ford's *An Overview of Hot-Deck Procedures* in INCOMPLETE DATA IN SAMPLE SURVEYS, vol. 3, part IV (Academic Press 1983, pp. 185 *et seq.*).

11. I have used imputation myself to deal, for example, with problems caused by application forms that have been lost or destroyed. Under certain circumstances, it can materially improve the quality, reliability and accuracy of a statistical analysis. Imputation has a rational scientific basis, its use by the Bureau of the Census appears to be supported by data correlations ("local homogeneity") observed in census data from previous years, the process is deterministic rather than random in its application, and there is to my knowledge no alternative method for dealing with missing data (*e.g.*, not imputing at all) that is as likely to improve the accuracy of the census count. Indeed, though plaintiffs may have demonstrated that imputing worked to their disadvantage in this instance, they have not to my knowledge demonstrated that imputing produced either an incorrect census count, or a count that is

less correct than one not using imputing.

Concerning Manipulability

12. The quality and completeness of a census are subject to a variety of influences, each of which may be characterized as manipulative, depending on one's viewpoint. The size of the overall census budget, the degree and type of training afforded the census takers, the differential amounts of time and other resources devoted to counting in some locales relative to others; all such factors, because they can be varied and because they will affect the final tallies, can be considered manipulative. As far as I am aware, there is neither proof nor allegation that the Bureau of the Census itself has pursued the counting of the 2000 census with any objective save that of achieving as complete a count as is practical.

1957 Legislative History

13. References to sampling occur several places in the legislative history attendant to the 1957 amendments to the Census Act, including the addition of Section 195. All of the references I have seen are consistent with the usual concept of sampling, namely that involving random selection and the estimation of some overall characteristics of the population. Nothing I have seen suggests that the user of the terms "sample" or "sampling" was referring to hot-deck imputation, or any similar procedure.

14. Although the term "sampling" is not defined, the statement of purpose accompanying the 1957 legislation to amend the Census Act indicates that the use of sample procedures would be authorized by Section 195, because experience had shown that some of the information desired in connection with a census could be secured efficiently through

a "sample survey" and that in some instances, a portion of the universe to be included might be efficiently covered on a sample rather than a complete enumeration basis. Amendment of Title 13, United States Code, Relating to Census: Hearing on H. R. 7911 before the House Committee on Post Office and Civil Service, 85th Cong., 1st Sess., 7 (June 19, 1957). This terminology evokes nothing more than the drawing of a sample by conventional sampling techniques such as random or probability sampling, and then using the sample to make inferences about overall qualities of the population from which it was drawn.

15. Another example of Congress' and the Census Bureau's use of the term "sampling" is provided by Dr. A. Ross Eckler's July 25, 1957, committee testimony. Dr. Eckler, Deputy Director of the Bureau, notes that after the1950 census, the Bureau engaged in a certain amount of testing work to determine the accuracy of figures obtained by means of small samples. Amendment of Title 13, United States Code: Hearing on H. R. 7911 before the House Subcommittee of the Committee on Post Office and Civil Service, 85th Cong., 1st Sess., 19 (July 25, 1957). His description is consistent with choosing a statistical sample using a standard technique such as probability sampling.

16. Similarly, in the August 9, 1957 Report on the proposed Census Act amendments, the committee notes that Section 195 authorizes the use of sampling procedures, except in connection with apportionment of Representatives, when efficient and accurate coverage may be effected through a sample survey. H. R. Rep. No. 85-1043, at 10 (1957). There is no proximate mention of imputation, or the use of an item in the sample to be substituted for an item not in the sample. Again, the usage of sampling terminology here is consistent with the circumstance in which a sample is drawn using

random sampling or some close variation, and the characteristics of the sample are projected to the population as a whole.

17. In his testimony on March 20, 1957, regarding the census budget, Bureau of the Census Director, Dr. Robert W. Burgess, refers to sampling in a variety of contexts. Department of Commerce and Related Agencies Appropriations for 1958: Hearing before House Subcommittee of the Committee on Appropriations, 85th Cong., 1st Sess. (March 20, 1957). With regard to foreign trade and shipping statistics, he seems to be referring to a sample gathered by some method such as probability sampling, and using that sample to make inferences about the population from which the sample was drawn. *Id.* at 673. Likewise, when Dr. Burgess discusses the possibility of using a 25% sample to collect detailed information about an individual's occupation and industry, his usage evokes again a sample drawn randomly, perhaps using a probability sampling technique, and then using the sample to estimate characteristics of the populace overall. *Id.* at 679. At the same hearing, Howard C. Grieves, Assistant Director for Economics, also spoke about the use of samples in collecting foreign trade statistics. His use of sampling terminology is consistent with a straightforward application of probability sampling or some close variant for the purpose of estimating some overall characteristics of the population being sampled. *Id.* at 686. When Dr. Burgess again mentions sampling in connection with a transportation survey, his use of the terminology is entirely consistent with an application in which a sample is drawn in accord with standard statistical techniques and used for the purpose of estimating overall characteristics of the population from which the sample is drawn. *Id.* at 699. Likewise, Dr. Burgess' reference to sampling in connection with passenger travel statistics appears to refer to an ordinary, scientifically drawn sample, whose

characteristics are to be extrapolated to the population as a whole. *Id.* at 701.

1976 Legislative History

18. The Committee Report dated March 24, 1976, regarding legislation for a mid-decade census and other amendments to the Census Act, discusses the possibility of using a sample survey in lieu of a full-scale census at mid-decade. H. R. Rep. No. 94-944, at 4,7 (1976). The discussion there suggests nothing other than the conventional meaning of a sample, namely that drawn according to a process such as probability sampling, for the purpose of estimating overall characteristics of the population.

19. Congresswoman Pat Schroeder's discussion of the bill on April 7, 1976 mentions that it "directs the Secretary of Commerce to use sampling methods rather than 100 percent questionnaires whenever feasible" and that "the committee has rejected the idea of using ... a 25 percent across-the-board sample survey." 121 Cong. Rec. 7, 9792. Ms. Schroeder's remarks appear not to refer to any form of sampling other than the conventional one, namely the drawing of a sample by random selection or one of its close variants, and the use of the resulting sample to estimate qualities of the population as a whole. In similar remarks on October 1, 1976, Congresswoman Schroeder describes the bill as directing "the Secretary of Commerce to use sampling methods rather than 100 percent questionnaires whenever feasible." 121 Cong. Rec. 24, 35171. Again, I see nothing in these remarks or their context to suggest that Ms. Schroeder intended her use of the word "sampling" to extend beyond the conventional – the drawing of a sample by standard techniques and its use to project to the population as a whole.

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20. The Committee Report dated September 16, 1976, on the legislation to provide for a mid-decade census of population, notes that one of the purposes of the legislation is "to direct the Secretary of Commerce to use sampling and special surveys in lieu of total enumeration in the collection of statistical data whenever feasible." S. Rep. No. 94-1256, at 1 (1976). With respect to the mid-decade census, the report notes that a "survey designed to include only 25 percent of the Nation's population ... would not be nearly so useful" as a full census. *Id.* at 3. In discussing Section 7 of the bill, the report notes that new language is added at the end of the subsection "to encourage the use of sampling and surveys in the taking of the decennial census," *id.* at 4, and that "the use of sampling procedures and surveys is urged for the sake of economy and reducing respondent burden," *id.* at 5. Concerning Section 8 of the bill, the report notes that the Secretary "may use statistical techniques such as sampling and surveys to produce current, comprehensive and reliable data." *Id.* It points out that Section 10 requires the Secretary of Commerce to use sampling procedures whenever he deems it feasible, except in the apportionment of the U. S. House of Representatives. *Id.* at 6. There is no indication here that the committee intended any meaning of sampling beyond the conventional – the drawing of a sample according to generally accepted probabilistic methods and the use of that sample to estimate qualities of the population as whole.

FEDERAL DEFENDANTS' RESPONSES TO INTERROGATORIES (EXCERPTS)

[caption omitted in printing]

1940 and 1950 Censuses

The Census Bureau has used imputation to account for missing data since 1940, when it began imputing missing or unknown ages (a form of "characteristic imputation"). Robert Jenkins, Procedural History of the 1940 Census of Population and Housing 67 (1983) (A.R. C00344). This process of imputing ages was called "allocation." In 1940, over 207,000 ages were allocated. A.R. C00458. No count imputation was conducted in 1940.

In 1940, the age allocation process was carried out entirely by hand. See 1940 Procedural History, at 68-73 (A.R. C00345-350). Two general principles were used in deciding what age to assign. First, where possible, the value assigned was guided by other data supplied for that person on the schedule. Id. at 69 (A.R. C00346). Second, the estimated age could not be inconsistent with any information on the schedule that was considered reliable. Id. If an age could not be established by reference to other data on the schedule, the age-assigner used a variety of tables and "decks" that reflected known distributions of ages to arrive at an estimate. Id. at 69-73 (A.R. C00346-50).

In 1950, imputation (allocation or "repair") of the missing characteristics of enumerated persons was extended from age to other characteristics. See Bureau of the Census, United States Dep't of Commerce, Procedural Studies of the 1950

Censuses, No. 2, The 1950 Censuses - How They Were Taken: Population, Housing, Agriculture, Irrigation, Drainage 30 (1955) (A.R. C00353). Values were again assigned on the basis of other information known about the person or from tables or "decks" that provided values based on information known about an appropriate subgroup of other people. Id. at 29-70 (A.R. C00351-75). New punch card sorting machines were used to automate the editing and coding process and also to automate the allocation process. Encyclopedia of the U.S. Census 197 (Margo J. Anderson ed., 2000) (hereafter "Encyclopedia") (A.R. C00431). Again, no count imputation was conducted in 1950.

1960 Census of Population and Housing

The 1960 Census marked the first time that count imputation was used. See Bureau of the Census, United States Dep't of Commerce, 1960 Censuses of Population and Housing: Procedural History 81-84 (1966) (hereafter "1960 Procedural History") (A.R. C00376-80). The 1960 Census was also the first census to use computers to produce the apportionment count. Id. Most of the editing and allocation was performed by computers. Id. at 82 (A.R. C00378); Encyclopedia, at 197 (A.R. C00431). The use of computers in the editing process led to more uniform processing of data than could be accomplished by clerks and also to more sophisticated allocation of data. 1960 Procedural History, at 82 (A.R. C00378).

With regard to allocation of characteristics as in earlier censuses, the general procedure used to impute entries for

missing characteristics was to assign values from a distribution of characteristics for the appropriate homogeneous subgroup of the population found in prior censuses or surveys. 1960 Procedural History, at 82 (A.R. C00378). In 1960, the use of the computer improved this methodology by also drawing on distributions implicit in the tabulation of the 1960 data and allowing the use of a larger number of subgroups. Id. In addition, beginning in 1960 (and continuing to the present), the Census Bureau imputed full sets of 100% characteristics for persons known to exist in occupied households but for whom no characteristic information was available (a process sometimes referred to as "substitution"). Id. at 83 (A.R. C00379). In 1960, the proportion of persons for whom allocation of one or more characteristics was performed was 3 percent of the total population. Id.

As indicated above, the 1960 Census also instituted count imputation. 1960 Procedural History, at 83 (A.R. C00379). In general, the missing population count data were taken from the previously processed schedule, which usually represented a neighboring housing unit. Id. This methodology, sometimes called the sequential hot-deck method, was designed to take advantage of neighboring unit correlations, *i.e.*, the tendency of households within a small geographic area to be similar in most characteristics, which have been shown to exist in the population. A portion of the individuals added through count imputation in the 1960 Census appear to have been necessary because of mechanical difficulties, specifically difficulties with FOSDIC (Film Optical Sensing Devise for Input to Computers), the computer imaging device used to record questionnaires. Id.

The Bureau reported that "[p]ersons substituted" due to "noninterview" or "mechanical failure" were responsible for 0.5 percent of the total U.S. census count in 1960. 1960 Precedural History, at 1-195 (Table B-1) (A.R. C00383). Because, as stated in note 1 supra, the Bureau's use of the term "substitution" has at various times included imputation of a full set of characteristics (age, sex, etc.) for a known, enumerated individual, in addition to count imputation, it is unclear whether the numbers in the cited table refer just to the number of count imputations or include other imputations. But see J. Beresford, The Need for a Study of Persons Created by Computer Edit in the 1960 Census 1 (Jan. 2, 1963) (A.R. C01188-90). Moreover, the Bureau's records do not reveal the exact numbers in this category but only the percentage.[2]

1970 Census of Population and Housing

In 1970 the Census Bureau introduced the mail-out/mail-back procedure, allowing for "self-enumeration" through completion of a written questionnaire.[3] Bureau of the Census, United States Dep't of Commerce, Report to Congress - The Plan for Census 2000, at 1 (Aug. 1997) (A.R. C00133); E. Goldfield, National Research Council, Innovations in the

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[2] The accuracy or source of the numbers cited at A.R. C01189 cannot be confirmed.

[3] In 1960, questionnaires were mailed out but individuals were instructed to turn them in to an enumerator who would be visiting their household.

Decennial Census of Population and Housing: 1940-1990, at 10, 41-43 (Aug. 1992) (A.R. C01353, 1384-86). In 1970 and each subsequent census, the largest share of the population has been enumerated through the mail-out/mail-back procedure. Id.

The 1970 Census used editing and imputation techniques similar to those used in the 1960 Census, except that in 1970 "far more extensive use was made of hot decks." Encyclopedia, at 197 (A.R. C00431); Bureau of the Census, United States Dep't of Commerce, 1970 Census of Population and Housing, Procedural History (PHC(R)-1) 15-65 (1976) (A.R. C00395). It appears that the Census Bureau performed both household size and occupancy imputation in the 1970 Census. The 1970 apportionment count included about 900,000 imputed persons. R. Killion, DSSD Briefs, Information, and Topics Memorandum Series #F-1, Sampling and Statistical Methods in Past Censuses 4 (Jan. 13, 1997) (hereafter "Sampling and Statistical Methods in Past Censuses (#F-1)") (A.R. C01463); United States General Accounting Office, Testimony, GAO/T-GGD-91-8, Statement of L. Nye Stevens, Director, Government Business Operations Issues, General Government Division, before the Subcomm. on Census and Population, House Comm. on Post Office and Civil Serv., at 11 (Feb. 21, 1991) (A.R. C00678) (hereafter "Nye Statement").

In addition, in the 1970 Census, two unusual situations arose that resulted in the use of imputation *in conjunction with* sampling to add persons to the apportionment count. See 1970 Census of Population and Housing, Evaluation and Research Program, Effect of Special Procedures to Improve Coverage in the 1970 Census (PHC(E)-6), Chaps. VI & VII (1976) (A.R. C00404-11) (hereafter "1970 Special Procedures"); Sampling

and Statistical Methods in Past Censuses (#F-1), at 2-4 (A.R. C01461-63). These procedures, known as the National Vacancy Check and the Post Enumeration Post Office Check ("PEPOC"), are described in more detail in the cited documents. Neither procedure has been used on a samping basis in subsequent censuses. See Sampling and Statistical Methods in Past Censuses (#F-1), at 2-4 (A.R. C01461). With regard to these procedures, defendants reiterate their general objection No. 9 to plaintiffs' definition of "statistical imputation" and more specifically object to plaintiffs' interrogatory to the extent that it may be interpreted to encompass the sampling aspects of these two procedures. As discussed below, the two procedures incorporated both sampling and imputation. Defendants include an explanation of the procedures for the sake of completeness but do not thereby agree or concede that the procedures, or the sampling involved in the procedures, constitute "statistical imputation" or "imputation" or that "imputation" or "statistical imputation" is a form of sampling.

The two procedures were as follows:

1970 National Vacancy Check. Near the end of the field enumeration phase of the 1970 census, it became apparent that a non-trivial proportion of occupied units had been incorrectly enumerated as vacant. Since there seemed to be no practical way to identify and obtain questionnaires for all of the misclassified units within the time limits and budget established for the Census, a sampling program was developed to

account for the errors. A national sample of units enumerated as vacant was rechecked, and the results were used to determine a selection parameter (*n*) for all of the units enumerated as vacant. A systematic selection of every *n*th vacant unit was then made, and that unit was convened to an occupied unit with the number and characteristics of the occupants of the nearest preceding occupied unit then imputed to it. Approximately 1,070,000 persons, representing 0.5% of the total population, were added to the official census count from this adjustment procedure. See 1970 Special Procedures, at 11-14 (A.R. C00404-07); Bureau of the Census, United States Dep't of Commerce, 1970 Census: Preliminary Evaluation Results Memorandum No. 12, Results of National Vacancy Check (July 27, 1971) (A.R. C00471-93).

1970 Post Enumeration Post Office Check (PEPOC). In this procedure, Post Offices in the 16 Southern states that had been enumerated through "conventional" census procedures (*i.e.*, the list/enumerate not the mailout/mailback procedure) checked the census listings of addresses, after field enumeration had been completed, and reported any unlisted units. Field followup was then conducted for a sample of the unlisted units to determine what percent had actually been enumerated in the Census. That percentage was used to determine how many housing units to add, and imputation procedures were then used to assign persons and characteristics to

those housing units. Approximately 480,000 persons were added to the official census counts from this procedure. See 1970 Special Procedures, at 15-16 (A.R. C.00408-09). In addition, records show that some 70,000 additional people were added through unspecified corrections made by the Population Division. See Bureau of the Census, United States Dep't of Commerce, 1970 Census: Preliminary Evaluation Results Memorandum No. 11, Final Tally of Census Adds in Sixteen Southern States (July 27, 1971) (A.R. C00465-70). No further information is available at this time about the latter corrections.

1980 Census of Population and Housing

The 1980 Census again included procedures for allocation of missing characteristics and substitution of complete sets of 100% characteristics. See Bureau of the Census, United States Dep't of Commerce, 1980 Census of Population and Housing: History, Part D, Ch. 6, at 6-28, 6-30 (1986) (hereafter "1980 Procedural History") (A.R. C00415, C00418). The 1980 Census also included both household size imputation and occupancy imputation (but did not include the sampling techniques used in the National Vacancy Check and PEPOC in 1970). Id.; D. Harner et al., Imputation in the 1980 Census (Nov. 4, 1982) (A.R. C00616); Nye Statement, at 12 (A.R. C00679). As in 1960, count imputation appears to have been used in instances of mechanical failure. 1980 Procedural History, Part C, Chap. 12, at 12-4 (A.R. C00413); D. Harner,

Census Allocation Program Evaluation - Proposed Study Plan (July 28, 1981) (A.R. C00547-54).

As in prior censuses, imputation of both household size and occupancy status was based on geographic proximity. As household data were processed sequentially, the new data were stored sequentially in a file. When occupancy or population data were incomplete, the computer referred to this sequential file, or "hot deck," to obtain data from the most recently processed housing unit. The specific procedures are described in more detail in the Affidavit of Barbara A. Bailar (Feb. 17, 1982) (A.R. C00566-74). In 1980, approximately 761,000 persons were added to the final count through imputation. Imputation of Population Counts (A.R. C00529-32).

1990 Census of Population and Housing

Count imputation in the 1990 Census differed from 1980 in three major ways. First, count imputation was reduced to the point that it was almost nonexistent. Only approximately 53,600 individuals were imputed in 1990, as opposed to about 761,000 in the 1980 Census and about 900,000 individuals in the 1970 Census. See Sampling and Statistical Methods in Past Censuses (#F-1), at 4 (A.R. C01463).

One reason for the very low rate of count imputation in 1990 relative to 1980 lies in the second major difference, that the Census Bureau instituted better questionnaire control procedures and more clerical edit procedures. See Statement of Stephen E. Fienberg, Maurice Falk Professor of Statistics and Social Sciences, Dean of the College of Humanities and Social Sciences, Carnegie Mellon University, before the Subcomm.

on Census and Population, House Comm. on Post Office and Civil Serv., at 6 (Feb. 21, 1991) (A.R. C00688); D. Griffin, Imputation in the 1990 Census Coverage Implications 6,8 (Aug. 31, 1991) (A.R. C00739-41).[4] These procedures resulted in a large drop in the number of housing units eligible for imputation. Id.

The third major difference relating to count imputation in 1990 was the first recorded introduction of status imputation. Based on information presently available to the Census Bureau, prior count imputation procedures had included only household size imputation and occupancy imputation. The 1990 imputation procedures continued the prior practice of using household size imputation and occupancy imputation but also added status imputation. See Bureau of the Census, United States Department of Commerce, DSSD 1990 REX Memorandum Series #BB-11, Summary of the 1990 Decennial

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[4] The "CCF" referenced by Griffin was the Census Control File, an address file maintained in the field that could be compared to the Address Control File, the predecessor to the MAF, to detect address problems at an earlier stage than in 1980. In addition, depending on the office where the enumerator follow-up questionnaires originated, returns received either an automated or a clerical edit, followed by a telephone call if discrepant data were found. Encyclopedia, at 197 (A.R. C00431). This clerical edit path gave clerks more human review of questionnaire forms and more opportunity to make judgments in resolving questionnaire discrepancies using prepared job aids. As a result, it appears that more discrepancies were resolved, and fewer returns were referred for imputation.

Census Edit and Imputation Procedures for the 100% Population and Housing Items 3 (Oct. 5, 1994) (A.R. C00778).[5]

The addition of status imputation was required because of the introduction of a centralized, computerized address list, called the Address Control File ("ACF"). Address registers for prior censuses had been maintained by hand in local census offices for each separate enumeration district, and no centralized address list was maintained. The 1990 ACF, in contrast, was a centralized, automated list of all housing units that was prepared in advance of the census. The existence of the ACF required reconciliation of each address having incomplete or conflicting information. If one source (the CCF, for example) indicated that a housing unit was a valid, nonduplicated unit, while the ACF indicated the unit should be deleted, this discrepancy had to be resolved. DSSD REX 1990 Memorandum Series #BB-7, Imputation in the 1990 Census - Coverage Implications, at 6 (Sept. 4, 1992) (A.R. C00739). The 1990 imputation procedures, therefore, had to allow for the

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[5] BB-11 was prepared by James Treat, a mathematical statistician, as part of the post-census evaluation program following the 1990 Census. Mr. Treat was instructed to form a group of knowledgeable Census Bureau employees, the imputation Algorithm Working Group, to review and better document the 1990 imputation specifications. The Working Group reviewed the details of the 1990 imputation program and produced BB-11, which therefore represents the authoritative statement regarding the 1990 imputation procedures.

imputation of a status of "delete," rather than only "occupied" or "vacant," to resolve these discrepancies.[6]

2000 Census of Population and Housing

With several exceptions noted below, the imputation procedures in Census 2000 were similar to earlier procedures. Thus, household size imputation and occupancy imputation were used, just as they had been used in 1960, 1970, 1980, and 1990. DSSD Census 2000 Procedures and Operations Memorandum Series #Q-34, Census 2000 Specifications for Imputing Housing Unit Status and Population Counts, at 2 (Sept. 26, 2000) (A.R. C00859) (hereafter "2000 Imputation Specifications (Q-34)"). In addition, as in 1990, status imputation allowed for the imputation of the existence or nonexistence of a separate, non-duplicated housing unit in instances where records were not conclusive about the unit. Id. Again, the imputation was performed through a variant of the hot-deck method.[7] Id.

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[6] No procedures similar to the National Vacancy Check or PEPOC were used in 1990.

[7] The cited memorandum describes this category as containing "units for which we know nothing" and "units identified with unknown status of occupied, vacant, or delete." 2000 Imputation Specifications (Q-34), at 1-2 (A.R. C00858-59). This memorandum was written primarily for Bureau insiders, and these descriptions are intended to be shorthand descriptions of addresses that are recorded in the DMAF but for which Bureau records reflect no final status of occupied,

The Census 2000 imputation procedures introduced several modifications. The details of the procedures used are set forth in 2000 Imputation Specifications (Q-34) (A.R. C00858-86) and are summarized below:

- The Census Bureau selected the donor housing units only from the universe of housing units that had their questionnaire completed by an enumerator, rather from the universe of all housing units. A.R. C00861. For mailback areas this meant that donors were restricted to those households requiring field follow-up. Also, if possible, the donor and the donee were both from a single unit structure or a multi-unit structure. A.R. C00862. The Census Bureau made this change because housing units in the follow-up universe are generally more similar to each other than to housing units that mail back their returns and households in single unit structures are more similar to each other than to those in multi-unit structures.
- A more sophisticated procedure was adopted to locate the donor unit. Rather than imputing from the nearest unit that was processed prior to the donee unit, the computer searched for the nearest acceptable (as defined under the first bullet above) donor unit from all processed units in the tract, rather than only those already processed. A.R. C00870.
- In 1990, the population count was capped at seven persons, the number of persons allowed on census mail

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vacant, or delete.

FEDERAL DEFENDANTS' RESPONSES TO INTERROGATORIES (EXCERPTS)

return forms; that is, no housing units with greater than seven residents were used as donor housing units. This cap was dropped in Census 2000 as no rationale supported the imposition of an arbitrary cap on the size of the donor unit.

- The clerical editing process was greatly reduced in Census 2000, replaced by increased computer editing that was less subjective, more uniformly applied, and more uniform across areas and groups.

A total of approximately 1.2 million persons, or 0.4 percent of the population, were added to the apportionment count in 2000 through count imputation. DSSD 2000 Procedures and Operations Memorandum Series B-17, Census 2000: Missing Housing Unit Status and Population Data (Feb. 28, 2001) (A.R. C01010-28).[8]

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[8] No procedures similar to the National Vacancy Check or PEPOC were used in 2000.

LETTER FROM CLERK OF U.S. HOUSE OF REPRESENTATIVES TO GOVERNOR MIKE EASLEY TRANSMITTING CERTIFICATE OF ENTITLEMENT, JANUARY 16, 2001

Jeff Trandahl
Clerk
Martha C. Morrison
Deputy Clerk

H-154 The Capitol

Office of the Clerk
U.S. House of Representatives
Washington, DC 20515-6601

January 16, 2001

The Honorable Mike Easley
Governor
State Capitol, 116 West Jones Street
Raleigh, NC 27603-8001

Dear Governor Easley:

Pursuant to the provisions of Section 2a(b) of Title 2 of the United States Code, I am hereby transmitting to you a certificate stating the number of Representatives to which your state is entitled in the United States House of Representative in the 108th Congress and in each subsequent Congress until a new reapportionment takes effect.

Sincerely,
/s/ Jeff Trandahl, Clerk
U.S. House of Representatives

LETTER FROM CLERK OF U.S. HOUSE OF REPRESENTATIVES TO GOVERNOR MIKE EASLEY TRANSMITTING CERTIFICATE OF ENTITLEMENT, JANUARY 16, 2001

Certificate of Entitlement

(seal omitted in printing)

HOUSE OF REPRESENTATIVES
OFFICE OF THE CLERK
WASHINGTON, D.C.

I, Jeff Trandahl, Clerk of the House of Representatives of the United States, Hereby Certify, Pursuant to the Provisions of Title 2, United States Code, Section 2a (b), That the State of

NORTH CAROLINA

Shall be Entitled, in the One Hundred Eighth Congress and in Each Congress Thereafter Until a Subsequent Reapportionment Shall Take Effect Under Applicable Statute, to

THIRTEEN REPRESENTATIVES

in the House of Representatives of the Congress of the United States.

In Witness Whereof I Hereto Affix My Name and the Seal of the House of Representatives of the United States of America this Sixteenth Day of January, 2001, in the City of Washington, District of Columbia

/s/ Jeff Trandahl
CLERK OF THE HOUSE OF REPRESENTATIVES OF THE UNITED STATES